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In the Supreme Court of the United States

OCTOBER TERM, 1977

No. 77-1046

MARCO DENTAL PRODUCTS, INC.,
v.
GEORGE K. AUSTIN, JR.,

Petitioner,

Respondent.

**BRIEF IN OPPOSITION TO PETITION FOR
A WRIT OF CERTIORARI**

*United States Court of Appeals
For the Ninth Circuit*

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QUESTIONS PRESENTED

1. Whether a lower court may nullify this Court's requirement of finding a synergistic result in a mechanical combination patent claim by holding one of the claimed elements to be "new."

Question 1 as restated by Respondent.

Is a claim for a combination of elements valid where court finds patented combination had two elements not found in prior art, and the evidence established that although the efforts of many others were unsuccessful, the invention solved a "thorny problem in the dental field," and had widespread use after its introduction?

2. Whether a claim may be upheld as valid which is to an exhausted combination made up solely of elements contained in other claims which claims the patentee admitted were invalid in view of the prior art.

Question 2 as presented by Respondent.

Is a claim which recites a number of elements, two of which are not shown in the prior art, an exhausted combination?

3. Whether a court may treat published offers to sell a satisfactorily tested patented invention as not being "on sale" within 35 U.S.C. § 102(b) by holding that a commercial system which included the invention had not been ready for delivery prior to the critical date.

Question 3 as restated by Respondent.

Is an uncompleted, untested device "on sale" merely because price lists refer to it in contemplation of its availability at some future time after the critical date?

STATEMENT OF THE CASE

The Austin invention is a control unit for automatically controlling the flow of air and water to a dental handpiece such as the high speed drills (500,000 rpm) used by today's dentists. These are air turbine driven and if cooling air and/or water are not applied to the tooth and drill, discomfort and injury to the patient can result.

The prior art is replete with attempts to provide a reliable, inexpensive, and trouble free control for dental handpieces. Twenty-six patents were introduced (PX-57) showing the efforts of prior workers and testimony was introduced of a number of others (PX-85, pp. 11-13). All of these were exceedingly complex and were expensive to manufacture. More importantly, because of their complexity, they were unreliable in operation. The defendant Marco's expert admitted the Austin control was simpler in construction, simpler in operation, had fewer manufacturing problems, was easier to assemble and to repair, and was less costly to manufacture than prior dental control units (TT 157-158).

As a result of its superiority over prior devices, it has met with great commercial success. Austin's company had sold by time of trial over 100,000 units, and a number of other manufacturers were utilizing Austin's principles.

Claim 1 of the patent in suit, Re. 28,649 (App. D hereof) calls for a combination of elements, including

a handpiece, a control block assembly having a plurality of pairs of ports closed by a diaphragm to provide a valve which controls the flow of air and water to the handpiece, a hanger valve assembly that controls the operation of the control block assembly automatically when a dentist lifts or replaces a handpiece in the hanger valve assembly, and associated conduits for air and water.

The invention is *not*, as petitioner asserts, page 3, merely the use of a diaphragm. The diaphragm valve of the entire block assembly may, as termed by the Trial Court, be the "heart" of Austin's invention, but like the heart of one's body it cooperates with other parts which are called for in claim 1. This Trial Court found and the Appellate Court specially noted that neither the hanger assembly nor the control block assembly (diaphragm valve) as called for in claim 1 were shown in the prior art. Perhaps the Trial Court's remark as to the diaphragm valve being the heart of the invention resulted from the impression created by comparison of this block with a tree-like assembly (See App. E) Marco's expert constructed from prior art elements he contended would perform the function of Austin's block. Upon its introduction the Judge remarked, "That looks like a pretty large valve." (TT 140).

Austin conceived the control block in the summer of 1968. After initially satisfying himself that his concept for the control block would work, Austin and his company, Adec, Inc., set about to develop a

complete control unit. The American Dental Association has a meeting each fall and Austin strove to complete a unit to display at the 1968 meeting in Miami which opened October 27, three days after the critical date. The first and then only partially completed unit was shipped to Miami on October 22. The parts to complete it were flown to the show on October 26 or 27 and installed there. Before shipping, a complete unit had not been tested nor ever seen by anybody outside of Adec, and it had no testing in a dental environment. A purpose in displaying it at the meeting was to get the reaction of dentists. The viewing dentists did in fact make suggestions which caused modifications to be made.

In early fall each year Adec printed its annual price lists. Speculating the control unit, to be called Auto-Trol, would be available for delivery in December 1968, it was listed in price lists in September. Adec was then a small company of thirty employees and did not want the expense of reprinting price lists. In fact, an Auto-Trol was not sold until December 1968 after modifying as a result of suggestions made by dentists at the Miami meeting. The application resulting in the patent was filed October 24, 1969.

ARGUMENT

I. Device of Claim 1 Comprises New Elements Arranged in Wholly Unobvious Combination.

Graham v. John Deere, 383 U.S. 1, 86 S. Ct. 684,

15 L. Ed. 2d 545 (1966) sets forth certain tests to be applied as an aid in making a determination of the statutory requirement of non-obviousness. Both lower courts in the present case carefully considered the invention in the light of these tests. In doing so, they examined and analyzed the prior art and specifically found the prior art did not disclose the control block (diaphragm valve) of claim 1 nor the hanger means. They noted the long search for a satisfactory automatic dental control unit, the level of skill, the failure of Marco's expert's company, among others, to solve the problem, the commercial success enjoined by Austin, and copying by others (A. 7-12, 22-24). They both found the combination to be unobvious. Indeed, the Court of Appeals observed "The invention was a significant step forward in the art of dental equipment." (A 11) and "that the Austin patent was more than just an improved product. It was an innovatively different one." (A12)

The Court of Appeals held that in a combination containing a new element, a finding of new and unusual results is unnecessary. Marco complains that this ignores the rule of *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, *Anderson's-Black Rock, Inc. v. Pavement Salvage Co.*, 396 U.S. 57, and *Sakraida v. Ag Pro, Inc.*, 425 U.S. 273. The philosophy of all these decisions is that combinations comprised *solely* of old elements should be considered with care to make certain that the public is not unjustly deprived of its right to use of the

old elements. Thus, as expressed in *A&P*, a combination of old elements should be scrutinized to determine if the elements function differently in the combination than out. Obviously, a new element in a combination cannot be examined in this light since there is no basis for comparison, and it was this fact which the Court of Appeals acknowledged in noting the *A&P* test could not be applied.

Marco argues that the diaphragm valve of claim 1 was old, contending that the cancelling of claims 17, 18 and 19 proves this. However, these claims did *not* call for the detailed diaphragm valve structure (control block having a plurality of pairs of ports all closed by the diaphragm) which was called for in claim 1. This the Trial Court recognized as did the Court of Appeals and correctly found that claim 1 in this respect called for a new element. (A10-12, 21-22) And, of course, both courts also noted that hanger arrangement was new (A 10).

The lower courts correctly applied the test of 35 U.S.C. 103 in light of this Court's rules and made no error in finding the device of claim 1 unobvious.

II. Claim 1 Is Not Directed to An Exhausted Combination.

Marco's argument is based on the premise Austin simply substituted a diaphragm valve in a combination otherwise allegedly shown in the Nielsen patent. The Court of Appeals found (A 10), however, as did the District Court (A 21), that the Nielsen patent did

not have a hanger for the handpiece which moved vertically to control the flow of air to the diaphragm valve as required by Claim 1. Thus, Austin's invention of Claim 1 was not merely, as Marco attempts to make out, the substitution of a new element in an otherwise old combination, but was in fact a totally new combination.

Marco contends Claims 7, 8 and 9 show the combination of Claim 1 is old. That is not so. They were broadly drawn to the concept of placing a plurality of valving assemblies (i.e., control blocks) together in a stack and did not attempt to claim the arrangement of a hanger means in combination with the control block as called for in Claim 1. Claims 7, 8 and 9 make no reference, in fact, to a "hanger means."

This clearly is not a case calling for the doctrine of exhausted combination as was present in *Lincoln Engineering Co. v. Stewart-Warner Corp.*, 303 U.S. 545, 549 (1938). There a fitting for a grease gun had been improved. This Court ruled that improving only the fitting did not entitle the inventor to claim the entire grease gun with the fitting. By analogy, Austin redesigned the grease gun.

III. The Invention Was Not on Sale Within Meaning of 35 U.S.C. 102(b).

This Court is urged to grant certiorari to resolve what comprises "experimental use." (Def. Br. 11). But this case raises no issue of experimental use! It was never contended at trial or before the Court of

Appeals that the invention of Claim 1 was used experimentally or otherwise before the critical date, October 24, 1968. The District Court specifically found:

The prototype was shipped to Miami about October 22, 1968. It had undergone rudimentary tests with air and water hookups; it had not been evaluated or used by any dentists.

. . . .

The Auto-Trol prototype was displayed to the public for the first time on October 28, 1968, (A 33)

This display was four days *after* the critical date. The Auto-Trol device when completed in Miami October 27 or 28, 1968 was the first time the combination of Claim 1 was completely assembled. As noted by the Court of Appeals, prior to October 24, 1968 there was only "an undeveloped, untested and incomplete device."

If actual sale of a device coupled with open, public (albeit "experimental") use of an invention as in *Elizabeth v. American Nicholson Pavement Co.*, 97 U.S. 126 (1878) is not a statutory "sale" of an invention, how can the mere listing of the price of a contemplated device in anticipation of future availability constitute a "sale" where the device was not completed before the critical date, and on such date was found by the District Court as "still being developed and tested." (A 34).

The lower courts correctly found that the Austin invention was not commercially exploited more than one year before the application for patent and that the invention was not "on sale" within the meaning of the 35 U.S.C. 102(b).

CONCLUSION

The petition is not substantial on the merits and suggests nothing of sufficient importance to command the attention of this Court. It should be denied.

Respectfully submitted,

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GEORGE K. AUSTIN, JR.,)
 Plaintiff-Appellee,) No. 76-3749
 v.) OPINION
)
 MARCO DENTAL PRODUCTS, INC.)
 Defendant-Appellant.)

WRIGHT, Circuit Judge:

Appellee, George K. Austin, Jr., alleges that appellant, Marco Dental Products, Inc. (Marco Dental), infringed Claim No. 1 in his patent [U. S. Patent No. Re 28,649] for a "dental handpiece control." His company, Adec, Inc., manufactures it under the trade name "Auto-Trol." Marco Dental sells a similar device.

Claim No. 1 describes a mechanism which automat-

ically controls the flow of air and water to a compact dental handpiece. The device combines a dental handpiece, a control block assembly and a hanger valve assembly. In operation it permits the automatic feeding of drive air, cooling water and air, and chip air¹ without requiring the dentist to adjust for each of the three to seven handpieces he may use with a typical patent.

Central to Austin's invention is the innovative use of flexible diaphragms to regulate the flows, such as those required in high speed drills. The district court succinctly described their function:

Behind each handpiece is a control block. When a dentist uses a handpiece, the air and water will flow into the control block, down a port to the diaphragm (which is flexed open when the handpiece is picked up), up the adjacent outlet port, out to the handpiece. When the dentist uses an adjacent handpiece, the air and water flow straight through the interceding control block and into the control block behind the handpiece being used. In this way, air and water only flow across the diaphragm of the particular control block connected to the handpiece being used.

Austin conceived his invention on a summer weekend in 1968 and by August of that year had constructed a prototype of the control block. Adec issued a wholesale price list effective September 1, 1968 giving

¹ Drive air operates small turbine-like motors which run the drills. Chip air blows away debris during drilling.

prices of four Auto-Trol models. A newsletter of October 7, 1968 sent to Adec customers introduced the new unit and other items. The prototype was displayed at a dental convention in Miami on October 27, 1968.

The original patent application was filed on October 24, 1969 and a patent was issued in February 1972 as No. 3,638,310. Three months later Austin sued Marco Dental for infringement.

On September 27, 1974 Austin filed for a reissue of his patent because the language of claims 1 and 4 was defective. He later submitted an amendment requesting that claims 17, 18 and 19 be cancelled, based on prior art patents brought to his attention by Marco Dental. Following the patent's reissue (No. Re 28,649) in December 1975, Austin filed an amended complaint for patent infringement.

The "on sale" issue was segregated from others. The district court held a trial in February 1976 on the issue of whether the Austin invention had been "on sale" more than one year prior to October 24, 1969, the filing date of the original patent application. The court held that it had not been "on sale" and denied Marco Dental's request for interlocutory certification.

The remaining issues of validity and infringement of the Austin reissue patent were tried later. Only claim 1 was at issue and the district court entered judgment for appellee after determining that the Austin patent was valid and infringed.

I.

"ON SALE"

The "on sale" provision, 35 U.S.C. § 102(b) states, in pertinent part:

A person shall be entitled to a patent unless—

.

(b) the invention was patented or described . . . in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States.

The rule of this circuit in determining whether the invention was "on sale" more than one year before the patent application was expressed in *Robbins Co. v. Lawrence Mfg. Co.*, 482 F.2d 426 (9th Cir. 1973), where we said:

A sale or an offering for sale precludes any inquiry into the experimental nature of the sale *unless* the contract of sale or the offering for sale contains an express or clearly implied condition that the sale or offering is made primarily for experimental use.

Thus the sale or offering would not ipso facto invalidate the patent nor preclude further inquiry into the experimental nature of the use where the contract or the offer . . . showed that the device was still experimental and that no workable prototype had been made (*Americo* [sic] *Contract Plate Freezers*, *supra*); . . . *Id.* at 433 (emphasis in original).

The invention must be completed before sales efforts become a bar. Appellant contends that Austin's invention, the control block was fully completed by August 1968, two months before the critical date of October 24, 1968. To support its argument Marco Dental points primarily to the Adec wholesale price list of September 1, 1968 and the October 7 Adec newsletter to its customers with its brief description of the Auto-Trol and the picture of a mock-up.

Amerio Contact Plate Freezers, Inc. v. Belt-Ice Corp., 316 F.2d 459 (9th Cir. 1963), also involved drawings and a mock-up of a freezing device shown to customers prior to the critical date. We held that, unless there was in existence a fully-operative device incorporating the invention prior to the critical date, there could be no "placing of the invention on sale in the sense intended by the statute." *Id.* at 464.

Ordinarily . . . selling activity . . . prior to the time that a fully-operative article or apparatus incorporating the invention comes into existence, is not a reliable indicium of competitive exploitation. Until at least an operative prototype has been completed and tested, the competitive effectiveness of such activity, in all probability, will be impaired by the aura of continuing developmental, experimental and testing effort. Moreover, at this stage, such activity is likely to be more for the purpose of eliciting needed changes in design and testing whether the market potential warrants continuance of the project, than to launch full-fledged commercial exploitation. *Id.* at 465.

The annual price list was mailed to Adec dealers after the conception of the invention and completion of a test model embodying the underlying principle, but before development of an operative Auto-Trol prototype.

The newsletter invited Adec customers to view the company's new products at Adec's exhibition booth at the American Dental Association convention in Miami on October 27-29, 1968. Many manufacturers including Adec previously had used dental conventions as a sounding board to elicit suggestions from practitioners for modifications and to measure possible acceptance of planned products before production and sale.

After some preliminary tests with air and water connections, a prototype was shipped to Miami about October 22, 1968. It had not been used or tested by dentists. In fact, suggestions were made at the convention for significant design changes. As a result, Adec substituted a metal hinge block for a plastic one and developed a "lock-out" device which allowed the handpieces to be engaged independently.

No Auto-Trols were sold before the critical date and pre-October 24 descriptions were of an undeveloped, untested and incomplete device.²

An examination of the legislative history sur-

² Compare *Kalvar Corp. v. Xidex Corp.*, 556 F.2d 966 (9th Cir. 1977), where it was held that plaintiff who sold and distributed samples of his product more than a year prior to the date of filing had acted in a commercial rather than experimental manner.

rounding the "on sale" provisions reveals that Congress was well aware that, before an invention was considered "fully completed" and the inventor was required to file to avoid the one year bar, it must be reduced to practice.

The first conceptions of ingenuity, like the first suggestions of science, are theories which require something of experiment and practical exemplification to perfect. Mechanical inventions are at first necessarily crude and incomplete. Time is required to develop their imperfections and to make the improvements necessary to their adaptation to practical uses.

S. Rep. No. 338, 24th Cong., 1st Sess. 6 (1836) *Cf.* S. Rep. No. 876, 76th Cong., 1st Sess. (1939); H. R. Rep. No. 961, 76th Cong., 1st Sess. (1939).

We believe the district court did not err in concluding that "Austin did not engage in the 'competitive exploitation of his invention' until after the critical date"

II.

"NONOBVIOUSNESS"

A new patent must not only be new and useful, but it also must be nonobvious. Section 103 provides:

A patent may not be obtained . . . if the differences between the subject matter sought to be patented and the prior art are such

that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains

The crucial question is whether the invention would have been obvious to one of ordinary skill in the pertinent art. *Saf-Gard Products, Inc. v. Service Parts, Inc.*, 532 F.2d 1266, 1270 (9th Cir.), *cert. denied*, 429 U.S. 896, 97 S. Ct. 258, 50 L. Ed. 2d 179 (1976).

With the addition of Section 103 as part of the 1962 Amendments to the patent laws Congress reoriented the focus of inquiry from novelty³ to nonobviousness. Faced with interpreting the meaning of non-obviousness the Supreme Court articulated a three-pronged standard for factual inquiry in *Graham v. John Deere, Co.*, 383 U.S. 1, 86 S. Ct. 684, 15 L. Ed. 2d 545 (1966).

According to that case, a court must examine: (1) the scope and content of the prior art; (2) the differences between the prior art and the claims at issue; and (3) the level of ordinary skill in the pertinent art. *Id.* at 17, 86 S. Ct. 684. *See also Globe Linings, Inc. v. City of Corvallis*, 555 F.2d 727, 730 (9th Cir. 1977).

The Court recently reemphasized that in determining nonobviousness the proper measure is not "what

³ *See, e.g. Hotchkiss v. Greenwood*, 52 U.S. (11 How.) 248, 13 L. Ed. 683 (1851) (functional approach to invention).

would be obvious to a layman, but rather what would be obvious to 'one reasonably skilled in [the applicable] art.' " *Dann v. Johnston*, 425 U.S. 219, 229, 96 S. Ct. 1393, 1398, 47 L. Ed. 2d 692 (1976). The *Graham* inquiry, moreover, must be made in the light of "the problem allegedly solved by the invention and the efforts of others to arrive at a satisfactory solution." *Reeves Instrument Corp. v. Beckman Instrument, Inc.*, 444 F.2d 263, 271 9th Cir. (1971), *cert. denied*, 404 U.S. 951, 92 S. Ct. 283, 30 L. Ed. 2d 268 (1971).

The district court found the patent at issue non-obvious under the *Graham standard*. Its *Graham* findings are determinative on appeal unless clearly erroneous. *Saf-Gard*, 532 F.2d at 1272. Here the court examined the prior art references, weighed expert testimony, and applied the proper test to the evidence.

Appellants primarily rely on, and the district court discussed at length, three prior art references: (1) the Nielsen patent (No. 3,466,749); (2) the Davis patent (No. 2,667,390); and (3) Williams' diaphragm valve (not patented).

As the district court noted in its opinion, the development of high speed air driven dental handpieces in the 1950's created a need for a more efficient system to control the flow of air and water to handpieces. Many control systems were developed but, before the Austin patent, none used a flexible diaphragm valve. A diaphragm valve system alone, however, was

not new and had been used in unrelated industries.⁴

Marco Dental argues that the Williams valve, used in truck scales, and the Davis patent, used in water softeners, presaged the use of the diaphragm valve. The trial court found these were large and bulky compared to the Austin valve which was miniaturized and particularly well suited for dental equipment.

The district court further distinguished the Austin diaphragm valve on the basis that the Davis patent and the Williams valve do not function to close all ports as does the Austin device. Testimony at trial indicated that this feature is a significant advantage because it is more effective in preventing leaks.

Appellant argues that the Nielsen patent demonstrates all elements of claim 1 except for the use of a diaphragm valve.⁵ The district court found, however, that the Nielsen patent also did not have a hanger for the handpiece which moved vertically to control the operation of a hanger valve.

Whether the differences cited rise to the level of patentability depends upon the level of ordinary skill in the pertinent art. Such a determination must follow

⁴ In a preliminary amendment dated March 7, 1975, Austin requested cancellation of claims 17, 18 and 19 because prior patents disclosing fluid flow control devices utilizing diaphragms made them invalid for broadness. He maintained that claim 1 remained valid because of the arrangement of passages and ports in the control block.

⁵ Austin conceded at the outset of trial that claims 7, 8 and 9 were invalid on the basis of the Nielsen patent, which disclosed a plurality of control blocks.

an analysis of the problems purportedly solved by the invention and the efforts of others to arrive at satisfactory solutions.

The record shows that until 1940 drill speed was relatively slow and heat generation was not serious. In the early 1950's, however, dental handpieces were developed with an air turbine device which increased the speed and generated more heat. Many manufacturers developed dental handpiece control systems using a variety of valves.

Generally the valves were large, required several moving parts and often malfunctioned. Abundant evidence exists in the record from which the district court could find that the Austin invention would not have been obvious to a researcher in the dental field in 1968. The invention was a significant step forward in the art of dental equipment.

Marco Dental's expert witness, Fishwood, testified that the use of flexible diaphragm valves was well developed and that persons of ordinary skill in valve design knew diaphragm valves could be substituted for spool, poppet and other types of valves. He concluded that the use of such a valve would have been apparent to an ordinary designer of dental equipment.

Fishwood's conclusion, however, is seriously undermined by the testimony of others. Fishwood's company developed the Williams valve and engaged in the manufacture of dental equipment and other industrial items. Its efforts over many years to develop an ef-

fective and efficient dental handpiece control were unsuccessful. A diaphragm valve, which has since become standard in the industry, was never utilized or developed by persons of "extraordinary skill" in the dental equipment field.

The district court's conclusion that the Austin patent was nonobvious is supported by the evidence and is not clearly erroneous as a matter of law.

III.

COMBINATION

The district court found that the Austin diaphragm valve was different in structure and function from that of the prior art references, specifically the Davis patent and the Williams valve, and thus was a new element. No finding of "unusual or surprising results" is required unless the patent merely combines old elements. *Great Atlantic & Pacific Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 71 S. Ct. 127, 95 L. Ed. 162 (1950); *Kamei-Autokomfort v. Eurasian Automotive Products*, 553 F.2d 603 (9th Cir. 1977).

Our review demonstrates that the Austin patent was more than just an improved product. It was an innovatively different one. See *Kamei-Autokomfort, supra*. The substitution of a diaphragm valve in combination with a hanger valve assembly was not read-

ily obvious to a person of ordinary skill in the field.

Miniaturization of the control block was realized, and its simplicity markedly reduced manufacturing and maintenance costs. Moreover, while secondary considerations are not conclusive, *Kamei-Autokomfort, supra*, circumstantial factors such as the resolution of a thorny problem in the dental field and the device's subsequent widespread use as a control mechanism buttress the conclusion of nonobviousness. See *Saf-Gard Products, Inc., supra*.

IV.

REISSUE

Marco Dental contends that the Austin patent was illegally reissued because, although Austin submitted an oath to support the reapplication for reissue, he did not submit one to support the cancellation of claims 17, 18 and 19 in his amendment.

The district court found no merit in this contention and we agree. The statute, 35 U.S.C. § 251, requires that the provisions relating to applications for patents shall be applicable to applications for reissue. An oath by the inventor is required by 35 U.S.C. § 115 and Austin complied. Amendments not constituting new matter do not require the supplemental oath of the inventor. See, e.g., *Aerosol Research Co. v. Scovill Manufacturing Co.*, 334 F.2d 751 (7th Cir. 1964).

The amendment in question did not constitute new matter but rather eliminated old matter, claims which Austin believed had been described too broadly and, therefore, relied on prior art.

V.

INFRINGEMENT

Marco Dental concedes its product has all elements recited in claim 1 of the Austin patent except for a drive air passage and a cooling air passage extending "therethrough". Given our determination that the patent is valid the question of infringement hinges on the meaning of the word "therethrough" as used in claim 1.

Appellant argues the term refers to a straight passage through each control block by which fluid or air passes from one block to another. It contends this reading is compelled because the Austin invention always contemplated multiple blocks instead of one and such passages serve no purpose unless multiple block units are used.

Austin asserts that "therethrough" refers to the "circuitous" passage which leads from one port to and from the diaphragm to another port. The appellant's device also have a "circuitous" passage leading to and from the diaphragm but has none carrying air and fluid directly from one control block to another. In

Marco Dental's product, air and water are delivered by a manifold block to an individual control block and do not pass from one block to an adjacent one as in the Austin invention.

The district court held that "therethrough" referred to the indirect or "circuitous" passage for air or fluid through the control block, to and from the diaphragm, and out to the handpiece. The court stressed that Marco Dental's interpretation ignores the language in claim 1 that the drive air passage and cooling fluid passage each have a "pair of ports intermediate [to] the inlet and outlet . . . opening into . . . the diaphragm chambers. . . ." [C.T. 40].

We believe the court's determination was not clearly erroneous and claim 1 of the Austin patent was infringed.

V.

INTERVENING RIGHTS

The patent law, 35 U.S.C. § 252, provides for intervening rights of a manufacturer who does not infringe a valid claim of the reissued patent which was in the original patent. It also states that reissuance neither affects any pending action nor abates any cause of action existing to the extent that the claims of the original and reissued patents are identical.

Appellant avers that claim 1 in the reissued patent

A16

is substantially different from the original claim and therefore it has acquired intervening rights. The district court concluded that the modification of claim 1 was to clarify and make more precise the language used without substantive changes in the claims. The doctrine of intervening rights is inapplicable where claims of a reissue patent are substantially identical to those of the original patent. *See, e.g., Akron Brass Co. v. Elkhart Brass Mfg. Co.*, 353 F.2d 704 (7th Cir. 1965). Appellant's arguments to the contrary are unpersuasive.

AFFIRMED.

A17

APPENDIX B

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF OREGON

GEORGE K. AUSTIN, JR.,)	Civil No.
	Plaintiff,)	74-343
v.)	OPINION
)	
MARCO DENTAL PRODUCTS, INC.)		
Defendant.)		

SOLOMON, Judge:

This is an action for patent infringement.

Plaintiff, George Austin, contends that defendant, Marco Dental Products, Inc. (Marco), infringed his patent on a dental handpiece control mechanism. Marco denies this contention and asserts in a counter-claim that Austin's patent is invalid.

Austin's patent (U. S. Patent No. 3,638,310) was issued in February 1972 upon an application filed in 1969. Several months after this action against Marco was filed, Austin applied for reissue of the patent with several modifications to clarify the scope of claim 1. In an amendment to the application for reissue, Austin cancelled claims 17, 18, and 19. The patent was reissued in December 1975 (U. S. Patent No. Re 28,649).

The patented device controls the flow of air and

water to a dental handpiece. The device permits drive air, cooling water and air, and chip air¹ to be automatically fed into the particular handpiece that a dentist wants to use. When the dentist picks up handpiece #1, he does not have to make any adjustments to get the air and water to that handpiece.

Austin's device uses flexible diaphragms to regulate the flow of air and water. Behind each handpiece is a control block. When a dentist uses a handpiece, the air and water will flow into the control block, down a port to the diaphragm (which is flexed open when the handpiece is picked up), up the adjacent outlet port, out to the handpiece. When the dentist uses an adjacent handpiece, the air and water flow straight through the interceding control block and into the control block behind the handpiece being used. In this way, air and water only flow across the diaphragm of the particular control block connected to the handpiece being used.

Before Austin's invention, manufacturers of dental equipment did not have a control mechanism which worked automatically, and which was both simple and reliable. The available mechanisms were bulky, unreliable, and often expensive. Austin's invention has been widely adopted in the industry.

A-dec, Inc., which is Austin's company, manufactures and sells dental handpiece controls using Aus-

¹ Drive air operates the small turbine-like motors which run the drills; chip air blows away debris during the drilling operation.

tin's invention. Marco sells a similar device (the accused device).

The principal issues are: (1) Is Austin's patent valid? (2) Does the accused device infringe Austin's patent?

Marco also raises additional issues: (3) Was the reissue of the patent properly granted? (4) Does Marco have intervening rights as a result of the reissue?

In a previous trial, I found that Austin's invention was not "on sale" more than one year before the patent application was filed and was therefore not invalid by reason of 35 U.S.C. § 102(b).²

This case is now before me on validity and infringement. The issue of damages has been segregated.

I. VALIDITY

A. The Prior Art

The development of high-speed, air-driven dental handpieces in the 1950's created the need for a more efficient system to control the flow of air and water to handpieces. Many control systems were developed which used standard needle valves, poppet valves, or spool valves operated by an electrical solenoid, air-

² *Austin v. Marco Dental Products, Inc.*, Civil No. 73-343 (D. Or., March 19, 1976).

driven piston, or other mechanical means. Typically, the valves used springs and required a number of moving parts. They were bulky, and often malfunctioned. No system used a flexible diaphragm to close ports to prevent the flow of air and water.

The use of diaphragms was not new. They were used in a variety of industrial mechanisms unrelated to dental equipment: milk processing equipment, paint sprayers, water softeners, and truck scales.

At trial, Marco introduced in evidence 21 patents or devices as representing the art as it stood in 1968, the time of the Austin invention. But Marco relied primarily on three of those references.

The first patent Marco cites is the Nielsen patent (U.S. Patent No. 3,466,749). Marco cites it as showing all of the dental handpiece control mechanism in claim 1³ of Austin's patent, except the diaphragm. retracting and storing hoses leading to a dental handpiece. Flow of drive fluid and cooling fluid to the handpiece is controlled through a selector block having a number of spool valves, one for each of the fluids to be controlled. When a hose is pulled a certain distance, a pilot valve is opened to pass air to a piston, which opens the spool valves, so that air and water may flow to the selected handpiece. When the hose is retracted,

³ Marco also claims, on the same ground, that claims 2 to 6, 12 to 16, and 20 to 21 of the Austin patent are invalid. Austin has conceded that claims 7 to 9 are invalid. Claims 17 to 19 were cancelled in the application for reissue. Nielsen has a console unit with trolley assemblies for

the air from the pilot valve is cut off to permit the selector block valve spool to close by a pair of biasing springs. Nielsen does not show a hanger for the handpiece which moves up and down when the handpiece is removed or replaced to control the operation of a hanger valve, which in turn controls the flow of fluid to the diaphragm chambers. This hanger is shown in claim 1 of the Austin patent.

Marco notes the Williams valve WM-195B and the Davis *et al.* patent (U. S. Patent No. 2,677,390) as teaching the use of diaphragm valves.

The Williams valve is used in built-in load weighing scales on log trucks and for other industrial purposes. The valve is large. It would require four Williams valves assembled in a tree-like structure, standing approximately 8 to 10 inches high and 7 inches in diameter, to perform the same function as Austin's control block, which is a 1-inch cube with a single diaphragm.

The Davis device, which is also very large, was designed for use in a water softener. It is essentially three Williams valves set side by side. A structure approximately 7 to 8 inches long, 2 to 3 inches wide, and 2 to 3 inches high would be required to perform the four functions of the Austin control block.

Both the Williams and Davis diaphragms function differently from that of Austin. All three use air or fluid under pressure to press against a diaphragm, closing inlet or outlet ports in the opposite face of

a control block. But Austin uses ports coming to a flat surface opposite the diaphragm so that all ports are closed by the diaphragm. The Williams and Davis diaphragms do not close all ports.

B. The Patented Device

Marco challenges the validity of the Austin patent on the ground of obviousness.⁴ Marco contends that because of the prior art, Austin's device was obvious to a person of ordinary skill in the art of making dental equipment. Marco contends that the Nielsen device contains all of the elements of Austin's device, except the diaphragm, and that the Davis and Williams devices show the diaphragm.

Even though the ultimate question of patent validity is one of law, the obviousness issue requires me to resolve the scope and content of the prior art, the differences between the prior art and the claims at issue, and the level of the ordinary skill in the pertinent art. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). Handpiece control systems were well known

⁴ 35 U.S.C. § 103 states:

"A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made."

in the dental equipment industry. Before Austin, the handpiece controls used standard valve technology, including needle valves, poppet valves, or spool valves; none used diaphragm valves. Diaphragm valves were known, but they were used only in arts far removed from dental equipment.

The diaphragm is the heart of Austin's invention. The Nielsen device does not use the diaphragm. The Williams and Davis devices are large and bulky; they are used for truck scales and water softeners. Tiny diaphragms had never been used, and their use in dental equipment was not obvious. In addition, Austin's handpiece hanger functioned differently from the Nielsen device; Austin's diaphragm functioned differently from the Williams and Davis devices.

Many companies had tried to develop simple, reliable, and automatic dental handpiece controls; none of them used or attempted to use diaphragms. They used regular spool valves, poppet valves, or other mechanical means. In fact, the same company which made the Williams valve for truck scales and other industrial purposes also made dental equipment; but the company did not use a diaphragm in its dental handpiece control.

Austin's device was a major step forward and satisfied a long-felt need in the dental equipment industry. The device has significant advantages over the earlier dental handpiece control systems: greater reliability, lower cost, more compactness, greater simplic-

ity, and ease of maintenance. It has been a great commercial success; the industry has almost uniformly switched to using devices like Austin's.

I find that Austin's device was not obvious in light of prior art.

C. Repatenting

Marco contends that Austin, in addition to claiming a diaphragm valve, the apparent novelty of the invention, has attempted to "repate an old combination" of elements consisting of a dental handpiece, hanger valve assembly, and control valve. To establish this defense, Marco must show that a single prior art reference disclosed a combination of all of the same elements in the same situation, united in the same way, to perform the same function. *Schroeder v. Owens-Corning Fiberglas Corp.*, 514 F.2d 901, 903-04 (9th Cir. 1975); *Manual of Patent Examining Procedure*, § 706.03(j). This Marco has failed to do.

I find that Austin has created a new handpiece control mechanism; all the elements of the invention were not disclosed in a single reference, and the elements did not function in the same manner. There is no merit in this contention of Marco.

II. REISSUE

Marco contends that the Austin patent was illegally reissued because although Austin submitted an

oath to support the application for reissue, he did not submit an oath to support the cancellation of claims 17, 18, and 19 in an amendment to the application.

There is no merit in this contention. Marco cited no authority for such a rule, and, in my view, there is no need to file a supplemental oath when one disclaims a claim in a patent. *See* 35 U.S.C. § 253.

Finally, Marco contends that it acquired intervening rights because the reissue changed the substance of the original claim 1. This contention is also without merit. The reissue of a claim does not give rise to intervening rights when the revisions do not enlarge or modify the substance of the original claim. *Akron Brass Co. v. Elkhart Brass Mfg. Co. Inc.*, 353 F.2d 704, 708 (7th Cir. 1965). Here, the reissue merely clarified and tightened the language of claim 1. There was no enlargement or modification of its substance.

III. INFRINGEMENT

Austin contends that Marco's dental handpiece control mechanism infringes claim 1 of the Austin reissue patent.⁵ The patent, and particularly claim 1, uses the

⁵ Claim 1 of the Austin reissue patent states:

1. In a dental handpiece control,
 - a solid control block having a drive air passage therethrough having an inlet and an outlet and a cooling fluid passage extending therethrough having an inlet and an outlet,
 - a diaphragm sheet positioned on a first face of the control block,

word "therethrough". Marco contends that its accused device does not infringe Austin's patent because

cover means secured to the outer face of the diaphragm sheet and the first face of the control block and having a pair of diaphragm actuating chambers therein, the drive air passage having a pair of ports intermediate the inlet and outlet thereof and opening into a *portion of said first face opposite* one of the diaphragm chambers and adapted to be closed by the diaphragm sheet, the cooling fluid passage having a pair of ports intermediate the inlet and outlet thereof and opening into [the other of] a *portion of said first face opposite* the diaphragm chambers and adapted to be closed by the diaphragm sheet, an air driven dental handpiece, air supply means supplying drive air under pressure to the inlet of the drive air passage, cooling fluid supply means supplying a cooling fluid under pressure to the inlet of the cooling fluid passage, air conduit means connecting the outlet of the drive air passage to the handpiece, cooling fluid conduit means connecting the outlet of the cooling fluid passage to the handpiece, *second fluid supply means for supplying fluid under pressure to the diaphragm chambers,* *valve means in said second fluid supply means for controlling the supply of fluid to said diaphragm chambers,* and hanger means serving to releasably support the handpiece and operatively connected to and controlling the valve means and operable by the weight of the handpiece [to close the valves and operable] *when the handpiece is positioned on the hanger means to open the [valves;] valve means to permit fluid under pressure to flow to the diaphragm chambers thus to cause said diaphragm sheet to be pressed against said first face and prevent flow of air and cooling fluid through the respective passages therefor and operable when the handpiece is lifted therefrom [.] to close the valve means to shut off flow of fluid under pressure to the diaphragm chambers thus to permit movement of said diaphragm sheet away from said first face and permit flow of air cooling fluid through the respective passages therefor. [and means under the control of the hanger means for supplying fluid under pressure to the diaphragm chambers.]*

its device does not have a passage "therethrough" as described in the patent and as used in claim 1.

Claim 1 of the Austin reissue patent states in relevant part:

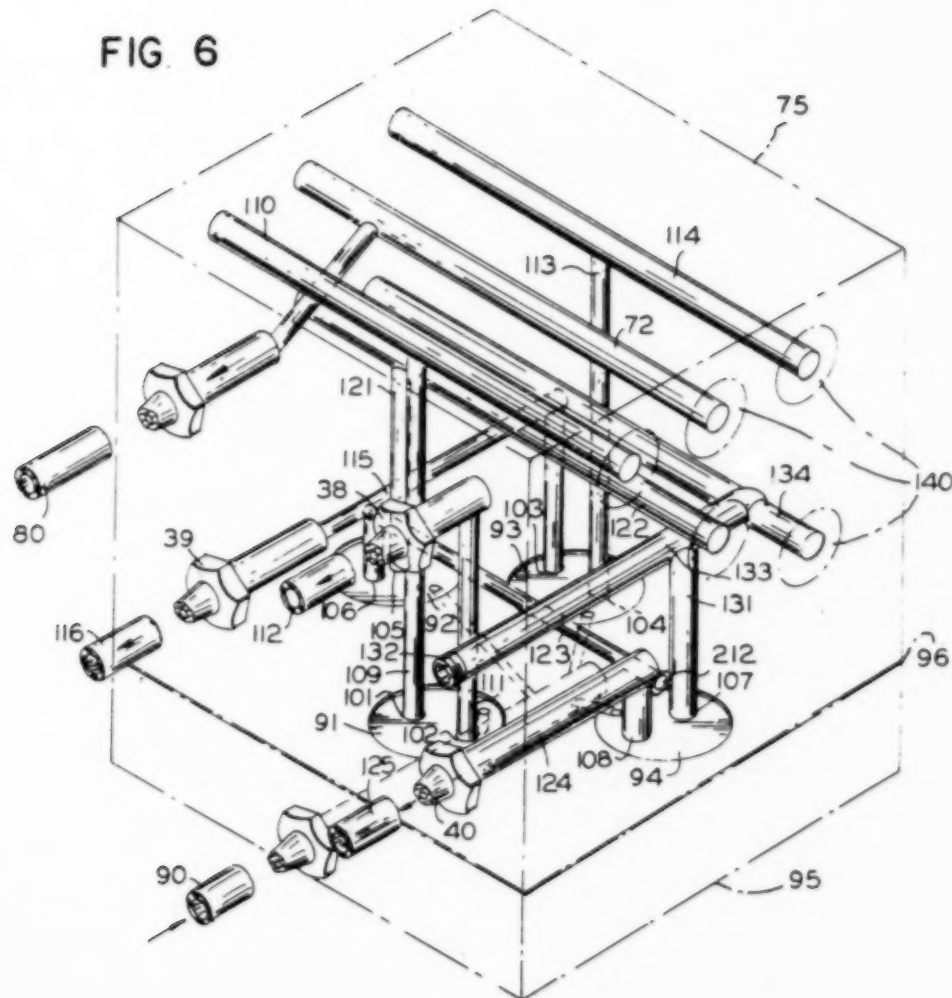
1. In a dental handpiece control, a solid control block having a drive air passage therethrough having an inlet and an outlet and a cooling fluid passage extending there-through having an inlet and an outlet,

the drive air passage having a pair of ports intermediate the inlet and outlet thereof and opening into a *portion of said first face opposite* one of the diaphragm chambers and adapted to be closed by the diaphragm sheet,

the cooling fluid passage having a pair of ports intermediate the inlet and outlet thereof and opening into . . . a *portion of said first face opposite* the diaphragm chambers and adapted to be closed by the diaphragm sheet . . .

Reissue patent Fig. 6 is reproduced below. I have marked some passages in solid black.

FIG. 6



GEORGE K. AUSTIN, JR.
INVENTOR

BY
BUCKHORN, BLORE, KLARQUIST & SPARKMAN
ATTORNEYS

Marco contends that "therethrough" refers to a straight passage through each control block which carries fluid (or air) from one block to another) passage 114 in Fig. 6).⁶ Austin contends that "there-through" refers to the passage which leads to and from the diaphragm (the passage marked in black in Fig. 6). The Marco device has passages like Austin's leading to and from the diaphragm (marked in black), but no passage carrying air and fluid straight through one control block to another (114 in Fig. 6). If Austin is correct, it is admitted that the accused device infringes. But if Marco's interpretation is correct—that "therethrough" refers to the full length of 114—there is no infringement.

The language of claim 1, when read with claims 2 and 3,⁷ confirms Austin's interpretation. The only

⁶ Passage 114 carries fluid through the control block; passage 134 carries air through the control block. Marco contends that the "cooling fluid passage therethrough" and the "drive air passage therethrough" in claim 1 refer to these two passages, 114 and 134. Austin contends that "cooling fluid passage therethrough" and "drive air passage therethrough" refer to the passages which pass through diaphragms 93 and 94 in Fig. 6. Because the same analysis applies to both the fluid and air passages, I discuss only one—the "cooling fluid passage therethrough."

⁷ Claims 2 and 3 of the Austin reissue patent state:

2. The dental handpiece control of claim 1 wherein the inlets open on a second face of the block and the outlets open on a third face of the block.

3. The dental handpiece control of claim 2 wherein the portions of the inlet passages on the inlet sides of the diaphragm sheet each is T-shaped with the stem of the T leading to the diaphragm sheet and the other portion leading from the second face of the block to a fourth face of the block.

interpretation of "therethrough" which is consistent with the language and the reference points in claims 1, 2, and 3 shows that "therethrough" refers to the indirect passage for air or fluid through the control block, to and from the diaphragm, out to the handpiece. Marco's interpretation ignores the language in claim 1 that the drive air passage and cooling fluid passage each have a "pair of ports intermediate the inlet and outlet . . . opening into . . . the diaphragm chambers"

I find that the accused device has this feature, as well as every element of claim 1 of Austin's patent. I therefore hold that plaintiff has established infringement.

I hold that the Austin reissue patent is valid and that Marco infringed claim 1 of this patent.

This opinion shall constitute findings of fact and conclusions of law pursuant to Fed. R. Civ. P. 52(a).

Dated this 12th day of October, 1976.

GUS J. SOLOMON

United States District Judge

APPENDIX C

IN THE UNITED STATES DISTRICT COURT FOR THE DISTRICT OF OREGON

GEORGE K. AUSTIN, JR.,)	
	Plaintiff,)	Civil No.
v.)	74-343
)	
MARCO DENTAL PRODUCTS, INC.)		
Defendant.)		

SOLOMON, Judge:

Plaintiff George Austin filed this action against Marco Dental Products, Inc. (Marco) for infringement of Austin's patent on a dental handpiece control (Patent No. Re. 28,649). Marco, in its answer, asserts that Austin's patent is invalid because the invention was "on sale" more than one year before the patent application date. This "on sale" defense was segregated for trial.

Section 102(b) of Title 35, United States Code, provides that an invention cannot be patented if it was "on sale in this country more than one year prior to the date of application for patent in the United States." Austin applied for his patent on October 24, 1969. The issue here is whether Austin's invention was "on sale" before October 24, 1968. I hold that it was not.

In 1965, Austin founded A-Dec, Inc., which de-

signs and manufactures dental equipment. A-Dec is the sole licensee for the manufacture and sale of Austin's patented invention—a mechanism for controlling the flow of air and water to a dental handpiece. A-Dec manufactures and markets a product called "Auto-Trol" which utilizes the patented mechanism.

Austin conceived of the invention in June or July 1968 while on vacation at the beach. He prepared a sketch of it. Shortly thereafter, Austin and A-Dec employees built a test model of the mechanism which showed that the invention would work. A-Dec then began to develop the Auto-Trol to utilize Austin's new mechanism.

In late August or early September 1968, A-Dec sent its annual price lists to its dealers. Although the Auto-Trol had not yet been developed, several models of it were listed.

In September and October 1968, A-Dec sent a newsletter to its dealers inviting them to see several new products, including the Auto-Trol, at A-Dec's exhibition booth at the American Dental Association convention in Miami, Florida, on October 27-29, 1968.¹

The newsletter contained a brief description of the Auto-Trol and a small picture of a mock Auto-Trol. The mock Auto-Trol consisted of only a modified front

¹ As with other new products, A-Dec planned to exhibit the Auto-Trol at the convention to get the reactions to it of dentists before it began to produce and sell it. At earlier conventions, dentists made suggestions which led to changes in products before they went on sale.

plate from a different piece of dental equipment; there was nothing behind the front plate.

The prototype was shipped to Miami about October 22, 1968. It had undergone rudimentary tests with air and water hookups; it had not been evaluated or used by any dentists.

At the Miami convention, A-Dec gave its salesmen an equipment catalog which included the statement that the Auto-Trol would be available "after December 1968."

The Auto-Trol prototype was displayed to the public for the first time on October 28, 1968, at the Miami convention. Before displaying the prototype at the convention, Austin changed some of its tubing and fittings.

During the convention, dentists told Austin that the Auto-Trol should be changed to allow a dentist to operate one handpiece without engaging other handpieces. Austin also discovered that a plastic hinge block in the prototype was not strong enough. No Auto-Trols were sold at the convention.

After the Miami convention, Austin made several changes in the Auto-Trol. He added a "lock-out" device to permit the handpieces to be engaged independently, and he substituted a metal hinge block for the plastic one.

In December 1968, the modified Auto-Trol prototype was displayed at a convention in New York

City. In that month, A-Dec began to produce Auto-Trols.

On these facts, I hold that Austin's invention was not "on sale" before October 24, 1968. Austin did not engage in the "competitive exploitation of his invention" until after that critical date. *Amerio Contact Plate Freezers, Inc. v. Belt-Ice Corporation*, 316 F.2d 459, 465 (9th Cir. 1963).

A-Dec did not put the Auto-Trol "on sale" by including it on the annual price lists issued about September 1, 1968, when no Auto-Trols, not even a prototype, existed. In addition, A-Dec expected to have the Auto-Trol available after December. It included the Auto-Trol on its September price lists to avoid preparing new price lists when the Auto-Trol became available.

On the critical date, October 24, 1968, the Auto-Trol was still being developed and tested. Some of its parts were makeshift, and it had not been evaluated or used by dentists. See *Robbins Company v. Lawrence Manufacturing Company*, 482 F.2d 426, 433 (9th Cir. 1973); *Amerio Contact Plate Freezers, Inc. v. Belt-Ice Corporation, supra*. The Auto-Trol prototype was displayed at the Miami convention primarily to get feedback from potential users. Several changes were made as a result of the convention exposure.

The defendant's "on sale" defense is denied.

Dated this 19th day of March, 1976.

GUS J. SOLOMON

APPENDIX D

United States Patent [19]

Austin, Jr.

[11] E **Re. 28,649**
[45] **Reissued Dec. 16, 1975**

[54] **DENTAL HANDPIECE CONTROL** 3,049,805 8/1962 Liedberg et al 32/22
[76] Inventor: **George K. Austin, Jr.**, P.O. Box 3,280,458 10/1966 Decley 32/22
209, Rte. 2, Box 254, Newberg, 3,514,171 5/1970 McGaha 32/22 X
Oreg. 97132

[22] Filed: **Sept. 27, 1974**

[21] Appl. No.: **510,042**

Primary Examiner—Robert Peshock
Attorney, Agent, or Firm—Klarquist, Sparkman,
Campbell, Leigh, Hall & Winston

Related U.S. Patent Documents

Reissue of:

[64] Patent No.: **3,638,310**
Issued: **Feb. 1, 1972**
Appl. No.: **869,088**
Filed: **Oct. 24, 1969**

[52] U.S. Cl. 32/22
[51] Int. Cl.² A61C 9/00
[58] Field of Search 32/22; 222/74; 128/173.1;
251/331, 61; 73/422; 137/594, 652, 635, 144

References Cited

UNITED STATES PATENTS

3,036,804 5/1962 Staunt 32/32

[57] ABSTRACT

A plurality of module control block assemblies individually control to a plurality of dental handpieces the supplies of drive air to the handpiece motors, and air and water coolants, and also supply drive air pressure to a gauge. The control block assemblies are clamped in series between distributing end blocks. A hanger assembly normally adapted to actuate a control block assembly when a handpiece is lifted from the hanger assembly has a manually operable lockout lever which prevents such actuation to permit changing of burrs of the handpiece or to inactivate that control block assembly.

18 Claims, 6 Drawing Figures

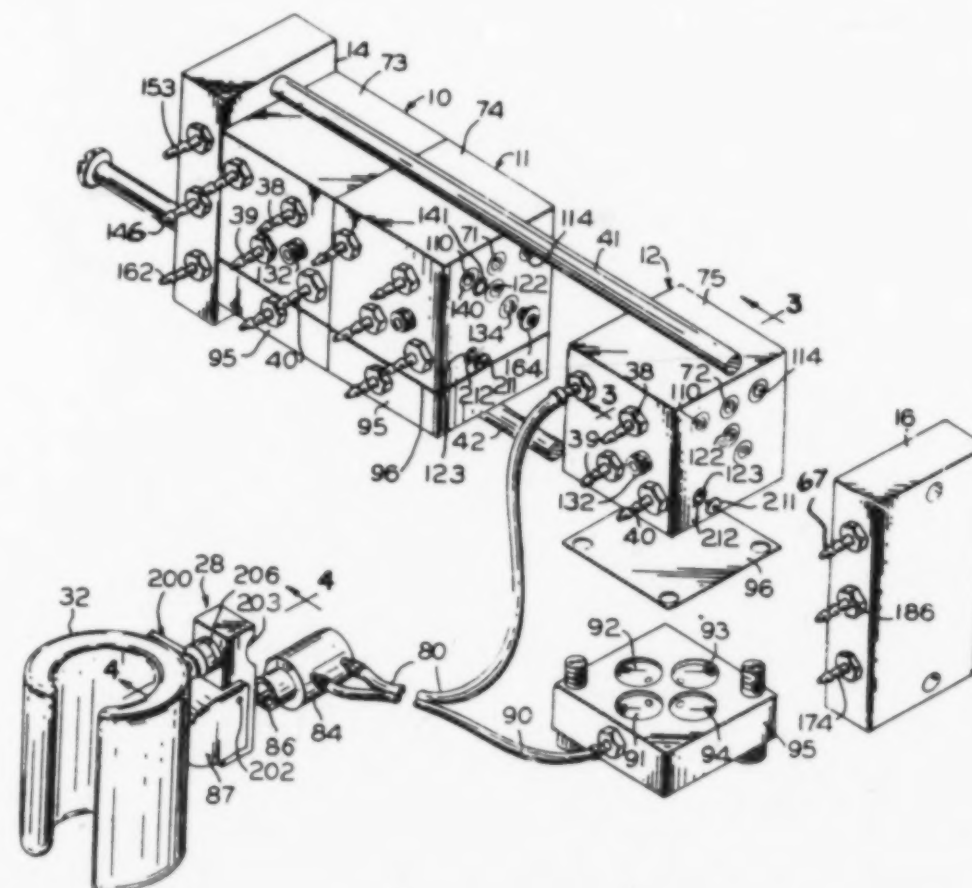


FIG. 4

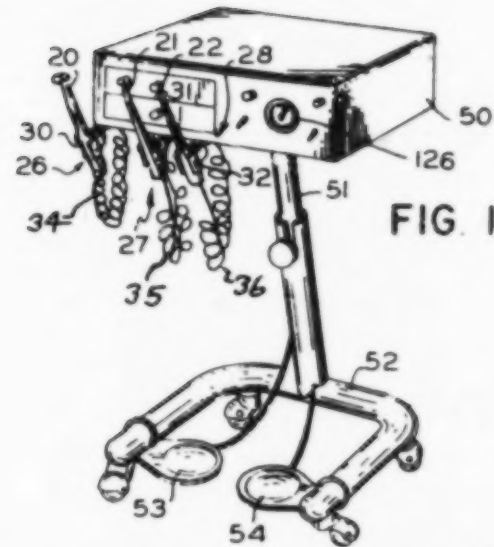
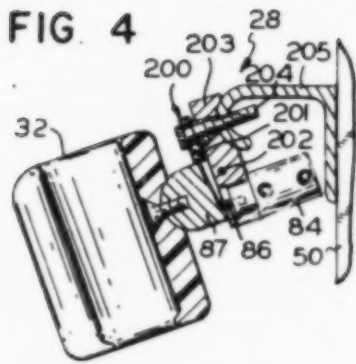


FIG. 1

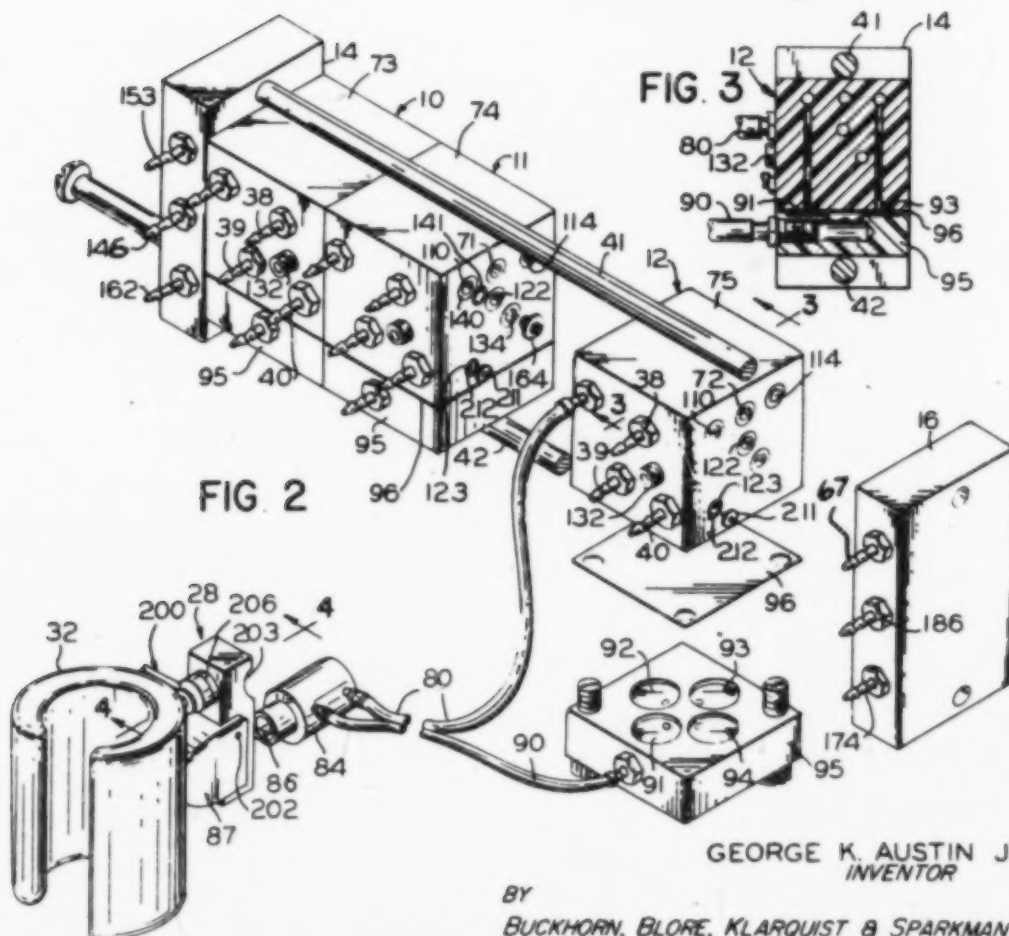
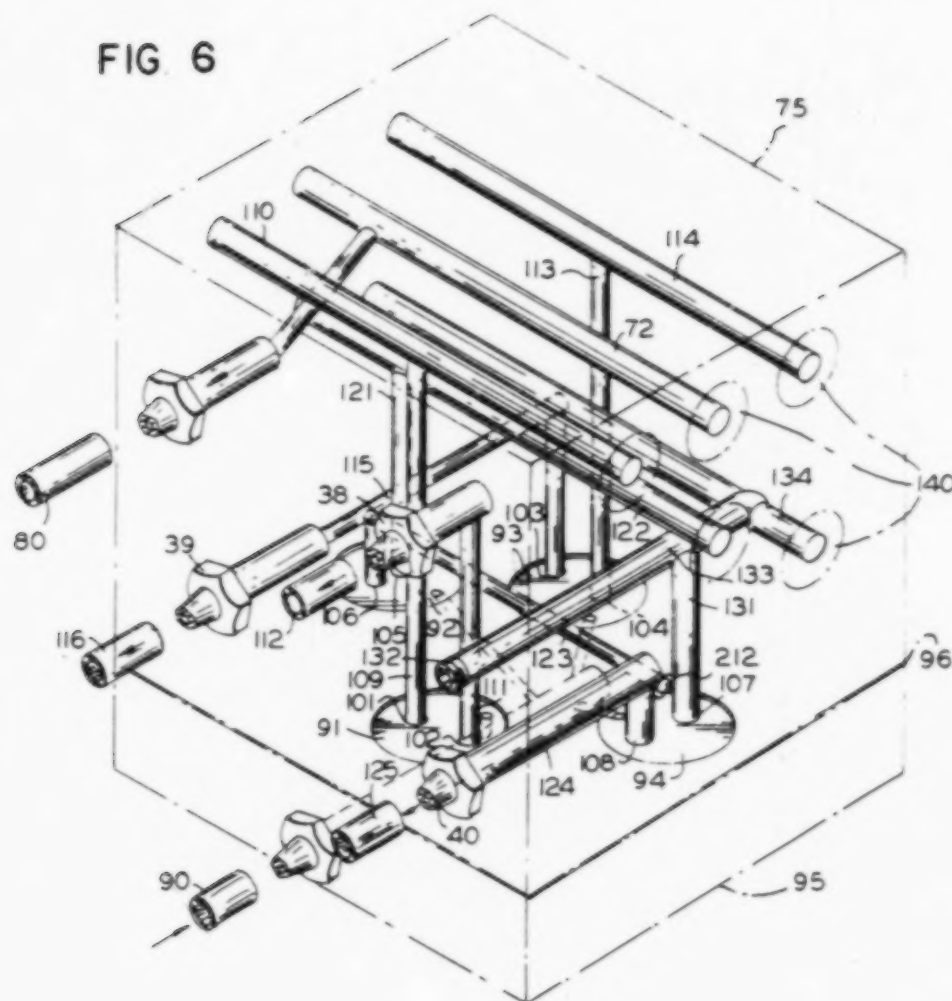


FIG 6



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BY

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ATTORNEYS

DENTAL HANDPIECE CONTROL

Matter enclosed in heavy brackets [] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates the additions made by reissue.

DESCRIPTION

This invention relates to a dental handpiece control, and more particularly to a module type dental handpiece control.

An object of the invention is to provide a new and improved dental handpiece control.

Another object of the invention is to provide a module type dental handpiece control.

A further object of the invention is to provide a simplified dental handpiece control.

Another object is to provide a dental handpiece control in which a plurality of control block assemblies positioned in a building block arrangement each serves to control drive air and coolants to one of a plurality of dental handpieces, it being possible to add additional control blocks to the arrangement or to subtract one or more control blocks from the arrangement.

Another object of the invention is to provide a control block assembly in which supply and discharge passages open on one face of a control block and a diaphragm sheet on said face may be selectively actuated to close the passage or to open passages to each other.

Another object of the invention is to provide a dental handpiece control having a control block assembly adapted to close or open lines of drive air and coolants to a dental handpiece under the control of a hanger assembly adapted to store the handpiece when not in use.

Another object of the invention is to provide a dental handpiece hanger assembly adapted to control the supplies of drive air and coolants and adapted to be locked out when desired.

In the drawings:

FIG. 1 is a perspective view of a dental cart having a dental handpiece control forming one embodiment of the invention;

FIG. 2 is an enlarged perspective view of the handpiece control of FIG. 1;

FIG. 3 is an enlarged vertical sectional view taken along line 3-3 of FIG. 2;

FIG. 4 is an enlarged vertical sectional view taken along line 4-4 of FIG. 2;

FIG. 5 is a schematic view of the control circuitry of the dental handpiece control of FIG. 1; and

FIG. 6 is a perspective, schematic view of a block assembly of the dental handpiece control of FIG. 1.

Referring now in detail to the drawings, there is shown therein a dental handpiece control forming one embodiment of the invention and including module control blocks 10, 11 and 12 (FIG. 2) mounted in series between end blocks 14 and 16 and serving to control the supply of drive air, cooling air and cooling water to handpieces 20, 21 and 22 in cooperation with hanger assemblies 26, 27 and 28, which include hangers 30, 31 and 32 for the handpieces and also serve as actuators to cause the control block assemblies to supply air and/or water to the handpieces when the handpieces are lifted from the hangers and to cause the control block assemblies to shut off air and water from the handpieces when the handpieces are stored in the hangers. Multipassage, retractible, flexible conduits 34,

35 and 36 each lead from connectors 38, 39 and 40 of the control block assemblies. Tie rods 41 and 42 clamp the assemblies 10, 11, 12, 14 and 15 together into a unit, which is mounted inside a desk or tray 50 supported by a cart post 51 carried by a wheeled cart base 52 carrying foot controls 53 and 54. The hanger assemblies 28, 29 and 30 are mounted on the front of the desk 50. The handpieces are well known and include selectively operable valves for the drive air, cooling water and cooling air.

The circuitry of the dental handpiece control is shown in FIG. 5, and includes an air supply line 61 leading from a source of air under pressure (not shown) to a line 62 to the foot control 53, a line 63 leading to an adjustable needle valve 64 and to a line 66 to a connector 67 of the end block 16. The line 66 and connector 67 supply air to series connected passages 70, 71 and 72 in blocks 73, 74 and 75, which are connected to hoses 78, 79 and 80 leading to known hanger valve assemblies 82, 83 and 84. Valve stems 86 (FIG. 4) of the hanger valve assemblies are engaged and pushed in or actuated by hinge blocks 87 when the handpieces are resting in the hangers 30, 31 and 32 and push out to released positions when the handpieces are removed from the hangers. When any one of the handpieces is removed from the hanger, the valve assembly 82, 83 or 84 blocks off the hose 78, 79 or 80 from a hose 88, 89 or 90 and relieves air pressure in the hoses 88, 89 or 90 to relieve air pressure in diaphragm chambers 91, 92, 93 and 94 in control block covers 95 of the control block assemblies 10, 11 and 12. This permits diaphragm portions of a flexible sheet 96 serving to seal the covers 95 to the blocks 73, 74 and 75, which are identical, to permit flow of fluids between the two ports of each pair of pairs of ports 101 and 102, 103 and 104, 105 and 106, and 107 and 108. The port 101 then supplies air coolant from passages 109 and 110 in the block 75 to the port 102, a passage 111 in the block 75, the connector 38 and a hose 112 to the handpiece associated with that control block assembly. The port 104 then supplies water coolant from passages 113 and 114 in the block 75 to passage 115, the connector 39, which is screwed into the outlet of passage 115, and hose 116 leading to the handpiece. The port 105 leads to gauge air passages 121 and 122 in the block 75, and receives drive air from the port 106, from passages 123 and 124 in the [clock] block 75, the connector 40 and a hose 125 leading to the handpiece so that a gauge 126 connected to the passages 122, which are in series, gives the drive air pressure. The port 107 supplies drive air from a passage 131, a needle valve 132 threadedly adjustable from the front of the block 75, and drive air passages 133 and 134 in the block 75.

The right-hand ends of the blocks 14 and the blocks 73, 74 and 75, which are identical, as viewed in FIG. 2, have shallow counterbores 140 in which O-rings 141 seat. When the [clocks] blocks are clamped together, the O-rings seal the junctures of the aligned passages 110, the aligned passages 70, 71 and 72, the aligned passages 114, the aligned passages 122 and the aligned passages 134, the left-hand ends of the blocks 73, 74 and 75 and the block 16 being planar and compressing the O-rings. Similar seals (not shown) are provided between the end blocks 14 and 16 and the blocks 73 and 75. An L-shaped passage 142 (FIG. 5), a connector 146 (FIG. 2) and a hose 147 (FIG. 5) connect the passages 122 to the air gauge 126.

The hose 63 (FIG. 5) supplies the coolant air to the

3

needle valve 64 and the air through a manually operable, toggle-type, shutoff valve 151 to a hose 152 leading to a connector 153, an L-shaped passage 154 in end block 14 and the air coolant passages 110. A hose 160 connected to drive air outlet hose 161 of the foot control 53 is connected by a connector 162 and an L-shaped passage 163 to the passages 134 in the blocks 73 and 74, a plastic plug 164 being positioned between and blocking the adjacent ends of the passages 134 in the blocks 74 and 75 to supply nonlubricated air to the handpieces 20 and 21. Lubricated air is supplied to the handpiece 22 (FIG. 1) from the hose 161 (FIG. 5), a hose 171, a lubricator 172, a hose 173, a connector 174 of the block 16, an L-shaped passage 175 in the block 16 and the passage 134 in the block 75.

Coolant water is supplied from a source under pressure (not shown) through hose 180, distributor block 181, hose 182, manually adjustable needle valve 183, toggle-type shutoff valve 184, hose 185, connector 186, L-shaped passage 187 in the end block 16, and the coolant water passages 114 in the blocks 73, 74 and 75. The valves 151 and 184 are relay-type valves with operating force being supplied by air hoses 190 and 191 connected to the hose 161. The control 54 is provided to supply coolant air to the handpieces without supplying drive air thereto.

In order to lock the hinge blocks 87 down, a lockout lever 200 (FIGS. 2 and 4) having an eccentric or cam portion 201 may be swung from an upright, retracted position to a horizontal, locking position preventing upward movement of the hinge block. The hinge block is mounted on a pin 202 carried by hanger block 203 fixed by screw 204 to bracket 205 fastened to the desk 50. The screw holds bushing 206 in a countersunk hole in the block and presses the block tightly against the bracket, the screw being screwed into a tapped bore in the bracket. The lockout lever 200 is of plastic and frictionally engages the screw to remain in adjusted position, the lever being mounted rotatably on the screw.

Plugs 211 are pressed into bores 123 and shallow counterbores 212 to seal off the ends of the bores or passages 104. These ends of the bores are open at the right-hand faces of the blocks 73, 74 and 75, as viewed in FIG. 2, to permit the passages 123 to be formed by boring.

I claim:

1. In a dental handpiece control,

a solid control block having a drive air passage therethrough having an inlet and an outlet and a cooling fluid passage extending therethrough having an inlet and an outlet,

a diaphragm sheet positioned on a first face of the control block,

cover means secured to the outer face of the diaphragm sheet and the first face of the control block and having a pair of diaphragm actuating chambers therein,

the drive air passage having a pair of ports intermediate the inlet and outlet thereof and opening into a portion of said first face opposite one of the diaphragm chambers and adapted to be closed by the diaphragm sheet,

the cooling fluid passage having a pair of ports intermediate the inlet and outlet thereof and opening into [the other of] a portion of said first face opposite the diaphragm chambers and adapted to be closed by the diaphragm sheet,

an air driven dental handpiece.

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air supply means supplying drive air under pressure to the inlet of the drive air passage.

cooling fluid supply means supplying a cooling fluid under pressure to the inlet of the cooling fluid passage.

air conduit means connecting the outlet of the drive air passage to the handpiece.

cooling fluid conduit means connecting the outlet of the cooling fluid passage to the handpiece.

second fluid supply means for supplying fluid under pressure to the diaphragm chambers.

valve means in said second fluid supply means for controlling the supply of fluid to said diaphragm chambers.

and hanger means serving to releasably support the handpiece and operatively connected to and controlling the valve means and operable by the weight of the handpiece [to close the valves and operable] when the handpiece is positioned or the hanger means to open the [valves] valve means to permit fluid under pressure to flow to the diaphragm chambers thus to cause said diaphragm sheet to be pressed against said first face and prevent flow of air and cooling fluid through the respective passages therefor and operable when the handpiece is lifted therefrom [] to close the valve means to shut off flow of fluid under pressure to the diaphragm chambers thus to permit movement of said diaphragm sheet away from said first face and permit flow of air cooling fluid through the respective passages therefor. [and means under the control of the hanger means for supplying fluid under pressure to the diaphragm chambers.]

2. The dental handpiece control of claim 1 wherein the inlets open on a second face of the block and the outlets open on a third face of the block.

3. The dental handpiece control of claim 2 wherein the portions of the inlet passages on the inlet sides of the diaphragm sheet each is T-shaped with the stem of the T leading to the diaphragm sheet and the other portion leading from the second face of the block to a fourth face of the block.

4. The dental handpiece control of claim 1 wherein the hanger means includes a pivotal hanger adapted to hold the handpiece and pivotal downwardly to a storage position from the weight of the handpiece; means urging the hanger to an upper released position when the handpiece is out of the hanger, the valve means being operable by the hanger when in its storage position for supplying fluid under pressure to the diaphragm chambers and to exhaust the diaphragm chambers when the hanger is in its released position, and manually operable means for locking the hanger in its storage position.

5. The handpiece control of claim 4 wherein the manually operable means is a lockout lever having a cam portion adapted to hold the hanger in its storage position.

6. The dental handpiece of claim 5 wherein the hanger means includes a mounting bracket, a mounting block mounting the hanger pivotally and a screw securing the mounting block to the bracket and pivotally mounting the lockout lever, the mounting block serving to support the valve means.

7. In a dental handpiece control,

a plurality of dental handpieces,

a plurality of valving assemblies one for each handpiece.

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means mounting the valving assemblies together in a stack,

the valving assemblies each including a plurality of fluid supply passages connected in series to corresponding fluid supply passages in the valving assemblies stacked adjacent thereto for supplying fluid to the valving assemblies.

means for supplying a plurality of fluids to each of the valving assemblies,

and a plurality of conduit means connecting each valving assembly to one of the handpieces for supplying fluids to the handpieces.

8. The dental handpiece control of claim 7 wherein each valving assembly includes a block in which the supply passages are straight bores aligned with the bores in the immediately adjacent blocks,

the blocks being mounted in face-to-face relationship with the bores aligned.

9. The dental handpiece of claim 8 wherein the blocks have shallow counterbores at the ends of the supply passages,

and O-ring seals mounted in and compressed in the counterbores.

10. The dental handpiece of claim 8 including plug means positioned in the adjacent ends of two of the supply passages.

11. The dental handpiece control of claim 7 including an end block having L-shaped fluid passages therein having one end of each connected to the supply passages of the control blocks immediately adjacent thereto.

12. In a control,

a control block having a first fluid passage having a bore extending from a first face to a port at a second face and a branch extending from the bore to a third face,

the control block also having a second fluid passage having a drive air bore extending from the first face to the second face and a second fluid branch extending from the drive air bore to a port at the third face,

the control block also including a first fluid outlet passage leading from a port at the third face near the port of the branch of the first fluid passage,

the control block also including a second fluid outlet passage leading from a port at the third face near the port of the branch of the second fluid passage,

flexible diaphragm means covering the ports in the third face and movable under pressure away from the ports,

diaphragm chamber means defining a first diaphragm chamber opposite the ports of the fluid branch and the first fluid outlet passage and covering a first portion of the flexible diaphragm means and also defining a second diaphragm chamber opposite the ports of the branch of the second fluid passage and the second fluid outlet passage and covering a sec-

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ond portion of the flexible diaphragm means.

and selectively operable means for supplying fluid under pressure to the diaphragm chambers to press the diaphragm means against the ports and close the ports from each other.

13. The control of claim 12 wherein the first face and the second face are at opposite sides of the block.

14. The control of claim 12 wherein the diaphragm chamber means is a cover adapted to cover the third face of the block and having recesses in the face thereof adjacent the diaphragm means and defining the diaphragm chambers.

15. The control of claim 14 wherein the cover is a block member having blind bores defining the recesses and including control fluid passage means to the bores.

16. The control of claim 15 wherein the control fluid passage means includes a main passage leading from one face of the block member and branch passages leading from the main passage to the blind bores.

17. In a control, a block having a fluid supply passage and a fluid discharge passage therethrough, the passages having adjacent ports at one face of the block, flexible diaphragm means covering the adjacent ports,

and diaphragm cover means defining a diaphragm chamber opposite the adjacent ports and adapted to selectively receive fluid under pressure to press the diaphragm means to a position closing the ports.]

18. The control of claim 17 wherein the diaphragm means comprises a sheet of flexible material.]

19. The control of claim 18 wherein the diaphragm cover means comprises a diaphragm block having the diaphragm chamber therein.]

20. In a control, a plurality of solid control blocks secured together in face-to-face relationship,

each of the control blocks having first passages opening into passages in an immediately adjacent one of the control blocks,

gasket means between the blocks sealing the areas around the junctures of the passages,

a plurality of diaphragm means mounted on the blocks,

the first passages having laterally extending branches having ports opening to the diaphragm means, and a plurality of additional passages in the blocks having ports adjacent the ports of the first passages and opening to the diaphragm means,

each diaphragm means being adapted when in one position to press against the adjacent ports and close them from each other and wherein a second position to permit flow from one of the last-mentioned ports to the other.

21. The control of claim 20 including end blocks secured to the control blocks and including passages communicating with the first passages.

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